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| 10/537,334 | 06/02/2005 | Pekka Strommer | 783.1011 | 3452 |

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| EXAMINER | |
|---|---|
| MIDKIFF, ANASTASIA | |
| **ART UNIT** | **PAPER NUMBER** |
| 2882 | |

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|---|---|---|
| 3 MONTHS | 01/19/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/537,334 | STROMMER ET AL. | |
| | Examiner | Art Unit | |
| | Anastasia Midkiff | 2882 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *01 November 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-30* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6, 14, 22, 23, and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claim 6, Lines 4-5 recite, "is moved in some other way" wherein the limiting meaning of "in some other way" is not understood.

With respect to Claim 14, Line 5 recites, "in relation to said direction," rendering the claim indefinite insofar as it is not understood which direction "said direction" refers to.

With respect to Claim 22, Line 5 recites, "some other kind of means" rendering the claim indefinite, as it is not understood what limitation is intended to be encompassed by "some other kind of means."

With respect to Claim 29, Line 5 recites, "the active surface of each module is positioned also in said direction," rendering the claim indefinite insofar as it is not understood which direction "said direction" refers to.

Claim 23 is rejected based on its dependency upon Claim 22.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-14 and 16-29, as they are best understood, are rejected under 35 U.S.C. 102(b) as being unpatentable over U.S. Patent to Tsutsui et al. (USP# 4,928,297).

With respect to Claims 1 and 16, Tsutsui et al. teach a diagnostic digital mammography imaging apparatus, and the method for its use, in which:

- radiation (6) from a source (1) that has passed through an object (1) to be imaged is detected on a sensor arrangement (4) containing at least one sensor (Column 1, Lines 50-51), which contains one or more elongated sensor modules (Figure 1);
- wherein the said sensor module contains one or more pixel columns which receive image data (Column 1, Lines 10-40);
- wherein the object to be imaged is positioned essentially motionless in the area between the source and the detector arrangement (Figure 5 and Column 4 lines 39-48);
- the object is scanned across with a beam which originates from the radiation source (Column 4 Lines 39-48);

- the focus (2) of the source is essentially motionless in space (Column 4, Lines 1-5);
- the beam is limited to be narrower than the object to be imaged (3, Figures 4-7) and adapted essentially to an active sensor surface of the sensor (Figures 4-7, Column 4 Lines 14-20);
- wherein the sensor is moved in synch with the scanning movement of the beam (Column 3 Lines 16-20, and Column 6 Lines 30-47) while at the same time the said active surface is kept essentially at right angles to the beam on a plane formed by the scanning movement of the beam (Column 4 Lines 39-46, and Column 6 Lines 30-47); and,
- wherein movement of the sensor or sensors is implemented by continuously adjusting the distance of the sensor or sensors from the radiation source with a guide (12) so that the sensors trajectory in direction of the scanning movement of the beam becomes essentially linear (Figures 5-7 and Column 4 Lines 39-46).

With respect to Claims 2 and 17, Tsutsui et al. further teach that the movement of the sensor (4) is realized by one or more actuators implicitly beginning the movement (Column 4 Lines 61-68, Column 5 Lines 1-6, Column 6 Lines 30-47).

With respect to Claims 3 and 18, Tsutsui et al. further teach at least a part of the movements of the sensor (4) are realized by mechanically forced control of a pendulum arm (11, Figures 4-7, and Column 4 Lines 40-44 and 61-68).

With respect to Claims 5 and 21, Tsutsui et al. further teach the said at least one sensor (4) is arranged in functional connection with a control element (at 12) which connection enables altering the distance between the sensor and the control element in the direction of the beam (via 13 and 13'), the said control element is moved along a curved trajectory (Figures 5 and 7) and the distance between the said at least one sensor and the control element is modified during the scanning of the beam in such a way that the trajectory of the sensor becomes linear (Figures 5 and 7, and Column 4 lines 39-46).

With respect to Claims 6 and 22, Tsutsui et al. further teach that the said control element (at 12) is moved in a guide groove (12), the curvature of radius of said groove corresponding to (via 13 and 13') the distance between the control element and the focus of the radiation source (Figures 4-7).

With respect to Claims 7 and 23, Tsutsui et al. further teach the said transmission element (at 12) is moved integrated with a pendulum arm (11) so that the sensor or sensors move in the direction of the longitudinal axis of the pendulum arm (Figures 4-7), the focus of rotation of the pendulum arm being situated on the level of the focus of the radiation source (Figures 4-7).

With respect to Claims 8 and 26, Tsutsui et al. further teaches the scanning movement of the beam (6) is realized by moving a collimation element (3) that limits the beam (Figures 4-7, and Column 6 Lines 30-47), implicitly requiring an actuator to begin said movement (Column 4 Lines 39-46 and 66-68, and Column 5 Lines 1-6).

With respect to Claim 9 and 24, Tsutsui et al. further teach a collimation element (3) that limits the beam (Figures 4-7) is moved essentially in parallel with the linear movement of the sensor (Column 4, Lines 39-46).

With respect to Claims 10 and 25, Tsutsui et al. further teach that the scanning movement of the beam is realized by moving a collimation element (3) which limits the beam along a curved path (Figures 4-7), the curvature of radius of said path corresponding to the distance (S) between the collimator and the focus of the radiation source (Column 4, Lines 1-20).

With respect to Claim 11, Tsutsui et al. further teach that the radiation source (1) is swiveled (Column 4 Lines 39-46) and the scanning movement of the beam is realized by moving the collimation element (3) in mechanical contact (via 11) with the swiveling movement of the radiation source (Figures 4-7 and Column 4 Lines 39-46).

With respect to Claims 12 and 27, Tsutsui et al. further teach that the movement of the collimation element (3) and the linear movement of the sensor (4) are synchronized mechanically by connecting them to the same pendulum arm (11) the focus of the pendulum arm being situated at the level of the focus of the radiation source (Figures 4-7), wherein said pendulum movement is implicitly begun by actuators (Column 5 Lines 39-46 and 66-68, Column 5 Lines 1-6, and Column 6 Lines 30-47).

With respect to Claim 13 and 28, Tsutsui et al. further teach that the movement of the collimation element (3) and sensor (4) in the direction of the scanning movement of the beam is synchronized (Column 4, Lines 39-46) by connecting said collimation element and said sensor or sensors mechanically (via 11) to a swiveling movement of

the radiation source (1), wherein said collimator elements and sensors movements are implicitly begun by actuators (Column 4 Lines 39-46 and 66-68, Column 5 Lines 1-6, and Column 6 Lines 30-47).

With respect to Claims 14 and 29, Tsutsui et al. further teach that the sensor (4) is arranged to be formed in the direction at right angles to the plane formed by the scanning movement of at least one sensor column (Figures 4-7) containing two or more modules (Column 1 Lines 10-40) and the active surface of each of the modules is also positioned at right angles with respect to the focus of the beam (Figures 4-7).

With respect to Claims 19 and 20, Tsutsui et al. further teach that:

- the said at least one sensor (4) is moved in such a way that the sensor is connected to a transmission element (part of 4 at 11) that is moved along an essentially linear trajectory (Figures 4-7);
- said connection is realized in such a way that the connection enables mutual rotational movement of the transmission element and the sensor in the direction of linear movement (Figures 4-7);
- whereby the said condition of perpendicular orientation of the sensor surface is realized by mechanically forced tilting the sensor or sensors along with the linear movement in relation with said transmission element (Column 4, Lines 44-46, Figure 7).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15 and 30, as they are best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsutsui et al., as for Claims 1 and 16 above, and in view of U.S. Patent Application Publication to Francke et al. (PGPUB# 2003/0174806).

With respect to Claims 15 and 30, Tsutsui et al. teach most of the elements of the invention, including an apparatus and method for digital imaging, said scanners known to be used in mammography, and the essentially linear movement of the sensors (4) located under an object to be imaged (Figures 4-7).

Tsutsui et al. do not specifically teach that object is positioned by two radiolucent compression paddles or equivalent with essentially plane-like surfaces, and wherein the essentially linear movement of the sensors is realized under the lower paddle structure.

Francke et al. teach a digital mammography scanning apparatus and the method for its use wherein an object to be imaged (Paragraph 21) is placed between two radiolucent compression paddles (84, 85, Paragraphs 29 and 36-39, and Figure 1), said paddles located above a sensor arrangement with an essentially linear movement (Paragraph 40) to provide a lockable, positionable support for the object (Paragraph 37).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the compression paddles of Francke et al. in the apparatus and method of Tsutsui et al. to prevent object movement during scan, said movement known to create image artifacts, thereby improving image quality.

***Allowable Subject Matter***

Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to Claim 4, the prior art of record teaches many of the elements of the claimed invention, including: a diagnostic digital mammography imaging apparatus, and the method for its use, in which radiation from a source that has passed through an object to be imaged is detected on a sensor arrangement containing at least one sensor which contains one or more elongated sensor modules; wherein the said sensor module contains one or more pixel columns which receive image data; wherein the object to be imaged is positioned essentially motionless in the area between the source and the detector arrangement; the object is scanned across with a beam which originates from the radiation source; the focus of the source is essentially motionless in space; the beam is limited to be narrower than the object to be imaged and adapted essentially to an active sensor surface of the sensor; wherein the sensor is moved in synch with the scanning movement of the beam while at the same time the said active surface is kept essentially at right angles to the beam on a plane formed by the scanning movement of

the beam; wherein movement of the sensor or sensors is implemented by continuously adjusting the distance of the sensor or sensors from the radiation source with a guide so that the sensors trajectory in direction of the scanning movement of the beam becomes essentially linear; wherein at least one sensor is moved in such a away that the sensor is connected to a transmission element, which is moved along an essentially linear trajectory and the said connection is realized in such a way that the connection enables mutual movement of the transmission element and the sensor in the direction of said linear movement, and whereby the condition of perpendicular orientation of the sensor surface is realized by tilting the sensor or sensors.

However, prior art does not teach or fairly suggest the system or method wherein the mutual movement of the transmission element and sensor or sensors is rotational, and that the tilting of said sensors or sensors occurs with respect to the transmission element, in the manner required by Claim 4.

***Response to Arguments***

Applicant's arguments, filed 01 November 2006, with respect to Claims 1-3 and 5-30 have been fully considered but they are not persuasive.

With respect to the Tsutsui reference, the Applicant asserts that Tsutsui does not teach or suggest moving the sensor in a linear trajectory while at the same time keeping the active surface of the sensor at a right angle to the beam from the x-ray source. The examiner respectfully disagrees.

As cited in the above action, Tsutsui teaches that an x-ray source (6) and sensor (4) are maintained in a fixed relationship (Column 6, Lines 30-47) with the active surface of the sensor at a right angle to an x-ray beam (6) from the source (Figures 1-6), wherein the entire apparatus is moved in a linear trajectory in Figure 6 (or *essentially* linear in Figures 5 and 7) while maintained said fixed relationship (Column 6, Lines 30-47).

With respect to Claim 1, the Applicant asserts that Tsutsui does not teach or suggest that the focus of the radiation source is essentially motionless in space, as the focus is moved along the shaft (Figures 5 and 7). The examiner respectfully disagrees.

As cited in the above action, Tsutsui teaches that the focus of the x-ray source is maintained in a fixed relationship to the sensor during the scanning operation (Column 6, Lines 30-47). The focus is adjustable to a desired height (Figures 5-7), but is not moved in this direction when scanning (Column 5, Lines 51-58, Column 6 Lines 1-9 and 30-53).

With respect to Claim 8, the Applicant asserts that Tsutsui does not teach or suggest an actuator for moving the sensor. The examiner respectfully disagrees.

As cited in the above action, Tsutsui teaches that the source and sensor are driven by the adjustable alignment shaft so that they have translational motion (Column 6, Lines 48-53), wherein said driving must be achieved by an actuator, *i.e.*, a device that creates mechanical motion by converting various forms of energy to rotating or linear mechanical energy.

Applicant's arguments, see Applicant Amendment, filed 01 November 2006, with respect to the objections to the drawings, specification, and claims have been fully considered and are persuasive. The objections to the drawings, specification, and claims have been overcome by the amendment.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anastasia Midkiff whose telephone number is 571-272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ASM
1/5/07

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER